

Nonobservation of ^{12}C cluster decay of $^{114}\text{Ba}^*$

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By means of the on-line mass separator at Gesellschaft für Schwerionenforschung, Darmstadt, we produced ^{114}Ba through the $^{51}\text{Ni}(^{58}\text{Ni}, 2n)$ reaction, separated it as a $^{114}\text{Ba}^{19}\text{F}^+$ beam, and implanted it into a stopper foil positioned in the center of an array of track detectors, which were used to search for ^{12}C radioactivity of ^{114}Ba . A total number of $(5.4 \pm 1.7) \times 10^4$ ^{114}Ba atoms were implanted. No ^{12}C event was found after a total exposure time of 116 h, corresponding to a ^{58}Ni beam dose of 1.3×10^{17} . The resulting upper limit of 3.4×10^{-5} (84% C. L.) for the branching ratio for ^{12}C decay of ^{114}Ba is considerably lower than the limits obtained in previous experiments, which represents an inconsistency at levels of more than 90%. A semiempirical estimate of 19.3 MeV for the upper limit of the Q value for ^{12}C decay of ^{114}Ba is derived.

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